REMARKS/ARGUMENTS

Claims 1-16 are now pending. Claims 1, 7, and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,420,165 to Weinstein in view of U.S. Patent No. 6,521,444 to Numata. Claims 1-4, 7-10, and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,723,242 to Ohkata et al. in view of Weinstein and Numata. Claims 5, 6, 11, and 12 were rejected as unpatentable over Ohkata in view of Weinstein and Numata, and further in view of U.S. Patent No. 5,563,066 to Buchanan.

Applicant appreciates the careful and thorough examination as reflected in the Office Action. For the reasons set forth below, it is submitted that the rejections have overlooked important distinctions between the claimed invention and the teachings of the cited references.

Claim 1 as currently amended is directed to "A system for cleaning a contaminated matter comprising dioxins by decomposing the dioxins in the contaminated matter, wherein the system comprises a reaction tank holding at least:

> at least one of crushed cells and fractions of the crushed cells comprising a pellicle of Bacillus midousuji *cultured in the presence of a chlorinated aromatic compound which has a substituent comprising an oxygen atom bonded to an aromatic ring and having a chloro group bonded to an aromatic ring*, wherein the at least one of crushed cells and fractions of the crushed cells comprising the pellicle of Bacillus midousuji breaks the ether bond of the structure of the dioxins;
>
> the contaminated matter; and
>
> an aqueous medium."

Claim 7 as amended is similarly directed to "A method of cleaning a contaminated matter comprising dioxins by decomposing the dioxins in the contaminated matter, wherein the method comprises:

> mixing at least one of crushed cells and fractions of the crushed cells comprising a pellicle of Bacillus midousuji *cultured in the presence of a*

chlorinated aromatic compound which has a substituent comprising an oxygen atom bonded to an aromatic ring and having a chloro group bonded to an aromatic ring, the contaminated matter, and an aqueous medium, wherein the at least one of crushed cells and fractions of the crushed cells comprising the pellicle of Bacillus midousuji breaks the ether bond of the structure of the dioxins."

Claim 13 is directed to "A preparation for decomposing dioxins, comprising at least one of crushed cells and fractions of the crushed cells which comprise a pellicle of Bacillus midousuji *cultured in the presence of a chlorinated aromatic compound having a substituent comprising an oxygen atom bonded to an aromatic ring and having a chloro group bonded to an aromatic ring*, wherein the at least one of crushed cells and fractions of the crushed cells comprising the pellicle of Bacillus midousuji breaks the ether bond of the structure of the dioxins."

Thus, the claimed system, method, and preparation employ crushed cells/fractions comprising a pellicle of Bacillus midousuji that has been *cultured in the presence of a chlorinated aromatic compound having a substituent comprising an oxygen atom bonded to an aromatic ring and having a chloro group bonded to an aromatic ring.*

As described in the present specification, the crushed cells/fractions of Bacillus midousuji cultured in this manner break an ether bond peculiar to dioxins, and thus the preparation allows decomposition of dioxins through a reaction between the crushed cells/fractions and the contaminated matter in the reaction tank, regardless of the number of chlorine atoms in the dioxins (see the specification at page 43, lines 8-18). Additionally, the decontamination system, method, and preparation as claimed is hardly affected by temperature or salt concentration, unlike cleaning methods (such as Weinstein's) that employ live microorganisms. For example, the crushed cells/fractions are able to decompose dioxins at temperatures lower than the temperatures allowing activity of Bacillus midousuji, and even in a high-salt environment (p. 43, lines 19-27). Additional advantages of the present system and method are enumerated at page 44 line 4 through page 46 line 2.

The claimed invention is not remotely suggested by the cited references. Column 2 line 66 through column 3 line 25 of Weinstein merely describes two cultures of Bacillus midousuji (designated SH2A and SH2B) that were deposited with the American Type Culture Collection (ATCC). Column 8, at lines 23-67, indicates that these strains of Bacillus midousuji are good extracellular secretors of proteins and thus may be good producers of industrial enzymes (while still alive, of course).

Column 17, lines 66-67 of Weinstein relate to an experiment in which live Bacillus midousuji of the SH2B strain was used to degrade dibenzofuran.

Nothing in Weinstein suggests that the Bacillus midousuji disclosed in that reference were "cultured in the presence of a chlorinated aromatic compound . . ." as claimed.

With respect to the aspect of the claimed invention wherein *crushed cells/fractions* of Bacillus midousuji are employed, as opposed to the *live* organisms disclosed by Weinstein, the Office Action asserted that Numata would have made it obvious to modify Weinstein's process and system to employ crushed cells/fractions of Bacillus midousuji. On the contrary, Applicant respectfully submits that if anything, Numata *teaches away* from using crushed cells/fractions.

In particular, Numata describes a prior approach (apparently disclosed in Japanese post-examined Patent Publication No. 8(1996)-3012) to decontamination of soil, wherein undesirable effects on the ecological system can be minimized by crushing the decomposing bacteria and then spraying them onto the soil. However, Numata states that "it will be readily appreciated that the crushing procedure of microorganisms takes extensive equipment, a lot of time and labor, and thus the spraying of a large amount of decomposing bacterium to the contaminated soil will be in fact very difficult" (col. 4, lines 5-14).

It must also be recognized that Numata does not disclose or suggest that Bacillus midousuji in particular would still be effective to break the ether bond of dioxin's structure even after crushing, nor is there anything in Weinstein or the other prior art of record suggesting this.

Therefore, it is submitted that because Numata teaches away from crushing, Weinstein's process and system would not have been modified to employ crushed cells/fractions of Bacillus midousuji as mentioned in Numata, particularly since there is nothing in the references suggesting that the crushed Bacillus midousuji would still be effective to decompose dioxins.

Furthermore, even if Numata and Weinstein were combined in the manner asserted in the Office Action, the combination still fails to teach or suggest the use of Bacillus midousuji cultured in the presence of a chlorinated aromatic compound as claimed.

In short, the cited references completely fail to teach or suggest the use of crushed cells/fractions comprising a pellicle of Bacillus midousuji cultured in the presence of a chlorinated aromatic compound for breaking the ether bond of dioxin's structure.

Accordingly, all pending claims are patentable over the cited references.

New Claims 14-16 have been added. Claim 14 depends from Claim 1, and further specifies that the Bacillus midousuji used in the system are cultured by a process comprising the steps of: mixing one of dioxins, a dioxin-containing substance, and chlorinated phenol with a medium comprising a nutrient source of Bacillus midousuji; supplying oxygen to the medium; and controlling the temperature of the medium to 62° C or above, which allows activity of the Bacillus midousuji. Support for this amendment is provided in the specification, for example at page 10 line 6 through page 11 line 8. Claim 15 dependent from Claim 7, and Claim 16 dependent from Claim 13, have also been added and include substantially the same language as Claim 14.

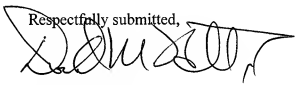
The cited references fail to teach or suggest a process, system, or preparation for decomposing dioxins, employing crushed cells/fractions of Bacillus midousuji cultured in the manner set forth in Claims 14 through 16. Accordingly, these claims are patentable for this additional reason.

Conclusion

Based on the above amendments and remarks, Applicant respectfully submits that the cited references do not render the pending Claims 1-16 unpatentable, and therefore the application is in condition for allowance.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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